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Four New Fishes of the Genus *Parapercis* with Notes on Other Species from the Indo-Pacific Area (Family Mugiloididae)

By Leonard P. Schultz
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Mugiloidid fishes of the genus *Parapercis* from the International Indian Ocean Expeditions (IIOE), 1964, the Te Vega Expeditions (TVE), 1963 and 1965, and the Smithsonian Institution Pacific Ocean Biological Survey (SIPOBS), 1964, together with other specimens in the United States National Museum form the basis of this paper. Among this material four new species were discovered and are described herein.

Dr. George E. Cantwell (1964), who revised the genus *Parapercis*, recognized 26 species. Not included in Cantwell's analysis of species are *P. okamurai* Kamohara (1960) and *P. kamoharai* Schultz (1966).

Dr. Chuichi Aranga (Seto Marine Biological Laboratory, Japan), who collected the types of *P. kamoharai*, informed me through correspondence that the type-locality was incorrect as published. He writes that he collected the types on the "Southwest Coast of Kii Peninsula, Wakayama Prefecture, south of Osaka Prefecture. This species inhabits the coastal waters, but it has never been collected from the inner part of any bay."

Parapercis okamurai Kamohara is very close to *P. aurantiaca*, both having palatine teeth, whereas all the new species described herein lack palatine teeth.

Since the recently discovered new species were unknown when Cantwell made his revision (loc. cit), I have extensively expanded and modified his "Key to the Species of *Parapercis*." Differences in counts between the two keys result from new counts by me, the correction of a few errors in the Cantwell key, and additional color descriptions. The following key distinguishes 32 species.

Key to the Species of *Parapercis*

1a. Palatine teeth present.
2a. 10 teeth in outer row of lower jaw.
3a. Total anal rays 19; soft dorsal fin rays 22; no dark spot at tip of chin; front of premaxillary plain brownish but lighter just laterally; side of upper lip with 2 small brown spots (southern and western Australia). **haackei** (Steindachner)
3b. Total anal rays 18; soft dorsal fin rays 21, rarely 22; dark spot at tip of chin; front of premaxillary with 3 brown-edged light cross bars; side of upper lip plain brown (Great Barrier Reef, Queensland, Australia, northward to Ryukyu Islands; Marshall and Fiji Islands). **cylindrica** (Bloch)
2b. 6 or 8 teeth in outer row of lower jaw.
4a. 6 teeth in outer row of lower jaw.
5a. 7–13 dark bars on upper side.
6a. Midbase of caudal fin with dark spot; brown-edged light bar across nape, interrupted at middorsal line by narrow brown isthmus; 10 narrow dark bars on upper side, one below spiny dorsal and 8 below base of soft dorsal (Japan, Korea, Formosa, and Hawaiian Islands). **multifasciata** Steindachner and Döderlein
6b. Midbase of caudal fin without dark spot; no light bar across nape.
7a. 13 narrow dark bars on upper side, 2 under spiny dorsal and 9 under base of soft dorsal fin (New South Wales, Australia) . . **binivirgata** (Waite)
7b. 7 broad dusky bars on upper side, sometimes absent after long preservation, with 5 of the bars under base of spiny and soft dorsal fins (Japan to Formosa) . . . . . **aurantica** Steindachner and Döderlein
5b. No dark bars on upper side or on back, coloration plain light yellowish; black spot at dorsal base of caudal fin; few small black spots above base of pectoral fin, pectoral axil blackish; few small black specks along anterior part of lateral line (Japan) . . . . . **okamurai** Kamohara
4b. 8 teeth in outer row of lower jaw.
8a. Dorsal fin spines longest posteriorly.
9a. Total pectoral rays 16 or 17; scales in zigzag row around caudal peduncle 30–34; 5 V-shaped dark bars on upper side; dorsal base of caudal fin with large black spot (Japan, Korea, Formosa to South China Sea). **sexfasciata** (Temminck and Schlegel)
9b. Total pectoral rays 19; scales in a zigzag row around caudal peduncle 27; no V-shaped dark bars on upper side; base of caudal fin without distinct large black spot; upper side tesselated in color pattern (Japan). **mimaseana** (Kamohara)
8b. Dorsal fin spines longest at middle of fin.

10a. Last dorsal fin spine connected by membrane to base of first soft dorsal ray; 5 dark V-shaped bars on upper side, 1 under spiny dorsal, 4 under soft dorsal; pectoral fin base with a black spot (Korea; Japan to Formosa). **snyderi** Jordan and Starks

10b. Last dorsal fin spine connected by membrane to first soft dorsal fin ray opposite tip of last dorsal spine.

11a. Dorsal fin rays IV,24; total pectoral fin rays 16; oblique scale rows 60–64; scales above lateral line 4 (New South Wales and South Australia). **ramsayi** Steindachner

11b. Dorsal fin rays V,23; total pectoral fin rays 20; oblique scale rows 50–54; scales above lateral line 6 (Japan and Formosa) . . **muronis** (Tanaka)

1b. Palatine teeth absent.

12a. 6 teeth in outer row of lower jaw.

13a. Last dorsal fin spine connected by membrane to base of first soft dorsal ray.

14a. Dorsal fin rays V,21 rarely 22; total anal rays 18, rarely 19; upper and lower caudal fin rays greatly elongated, with brownish coloration (Hawaiian and Seychelles Islands) . . . . . **schauinslandi** (Steindachner)

14b. Dorsal fin rays V,22; total anal rays 19; no caudal fin ray greatly elongated.

15a. Oblique rows of scales above lateral line 56–62; scales above lateral line to first soft dorsal ray 4 or 5 with 13–15 below to anus; zigzag row of scales around caudal peduncle 24–30.

16a. Total pectoral rays 16; zigzag row of scales around caudal peduncle 26–30; total gill rakers 9–12; anterior rays of soft dorsal fin greatly elongated (Singapore and Hainan) . . . . . **filamentosa** (Steindachner)

16b. Total pectoral rays 17–19; zigzag row of scales around caudal peduncle 24–26; no soft ray of dorsal elongated.

17a. Total pectoral fin rays 18 or 19; gill rakers 6 or 7+12–16=19–23 (Arabian Sea, Bay of Bengal, Andaman Sea, Misoöl Island [2°S 130°E], Philippines, and China Sea) . . . . . **alboguttata** (Günther)

17b. Total pectoral fin rays 17; gill rakers 4 or 5+9 or 10=14 or 15 (Somali coast and Red Sea) . . . . . **simulata,** new species

15b. Oblique rows of scales above lateral line 70–83; scales above lateral line to base of first soft dorsal ray 8–10, and below lateral line to anus 20–24; zigzag row of scales around caudal peduncle 35–44.

18a. Total gill rakers 17–20; oblique scale rows above lateral line 70–77; 3 dark stripes across interorbital space; 5 V-shaped dark bars below dorsal fins, but no broad, light, lengthwise streak with dark edge along middle of side, interrupting the dark bars (Bustard Head, Queensland to Dampier Archipelago, Western Australia) . . . . . **emeryana** (Richardson)

18b. Total gill rakers 11–17; oblique scale rows above lateral line 77–87; no dark stripe in interorbital space; dark bars somewhat V-shaped below dorsal fins, interrupted along middle of side by dark-edged, broad, light streak (Durban, Natal, Persian Gulf, Madagascar, off Somali, Reunion, West Australia, Queensland, and New South Wales). **nebulosa** (Quoy and Gaimard)

13b. Last dorsal fin spine connected by membrane to first soft dorsal ray opposite tip of last dorsal spine.

19a. 4 dorsal fin spines.

20a. Small intense black spot in each of 9 vertical bars on side along lengthwise line just below midside; black ocellate spot just above opercle; midcaudal fin rays occasionally with white area in basal half; snout in front of eyes notably brown spotted; anal fin distally with single series

of small dark spots (Philippines, Marshalls, Gilberts, East Indies, Samoa, Fiji Islands, Carolines) . . . . . **clathrata** Ogilby

20b. No small black spots in dark vertical bars on side of body as in *clathrata;* no black above opercle; middle caudal fin rays with white blotch in distal half of fin; snout without brown spots; no row of brown spots distally on anal fin (Philippines, Marianas, Marshalls, Gilberts, Fiji Islands, Ceylon, Ryukyu Islands, East Indies, Carolines, Mauritius, and off Thailand). . . . . **cephalopunctata** (Seale)

19b. 5 dorsal fin spines.

21a. Zigzag row of scales around caudal peduncle 26–32.

22a. Oblique scale rows 55–64.

23a. Large dark ocellate spot above operculum and above lateral line; exposed distal part of each soft anal ray dusky; dark vertical bars on sides meeting at midventral line of body (Japan to East Indies, Samoa, Fiji Islands, Bay of Bengal, Cocos Islands) . . . . . **tetracantha** (Lacepède)

23b. No dark ocellate spot as in *tetracantha;* exposed distal tips of soft anal rays unpigmented; dark vertical bars on sides not continuing to midventral line of body (Japan to Queensland, Fiji Islands, Zanzibar, Madagascar). **xanthozona** (Bleeker)

22b. Oblique scale rows 66–72; cheeks and rear of head with conspicuous light and dark cross-bars; side of body with 7 light bars ending in 7 black ocellate spots on lower side, leaving belly plain light tan; 7 scales from base of first soft dorsal ray to lateral line (Japan) . **kamoharai** Schultz

21b. Zigzag row of scales around caudal peduncle number 24–26.

24a. Oblique scale rows 51–55, with 4 scales above lateral line to base of first soft dorsal ray and 12–13 below lateral line to anus; gill rakers 5 or 6+9 or 10 on first arch (off coast of Somali) . . . **somaliensis,** new species

24b. Oblique scale rows 56–62, with 5 scales above and 13 or 14 below lateral line; gill rakers 6+9 or 10 on first arch.

25a. 2 dark bars across belly between bases of pelvic fins and anus; no dark spot on side of body below depressed pectoral fin (Seychelles Islands). **bivittata,** new species

25b. No dark bars across belly; 3 dark ocellate spots in row on side in area between depressed pectoral fins and that of pelvic fins (Seychelles Islands). **trispilota,** new species

12b. 8 teeth in outer row of lower jaw.

26a. Dorsal fin spines longest posteriorly; caudal vertebrae 18.

27a. Dorsal rays V(rarely VI),20; total anal rays 17, occasionally 18; scales above lateral line 10–12; total gill rakers on first arch 21–26; brownish pigment at base of pectoral fin (New Zealand, Chatham, and Alderman Islands) . . . . . **colias** (Bloch)

27b. Dorsal rays V,21; total anal rays 18; scales above lateral line 4–7; total gill rakers on first arch 15–20; base of pectoral fin without brown coloration.

28a. Oblique scale rows 60–65; zigzag scales in row around caudal peduncle 25–29; scales in row from lateral line to anus 16 or 17, and above lateral line 4 or 5 (New South Wales, South Australia, Tasmania). **allporti** (Günther)

28b. Oblique scale rows 65–69; zigzag scales in row around caudal peduncle 30–34; scales in row from lateral line to anus 18 or 19, and above lateral line 6 or 7 (New Zealand) . . . . . **gilliesi** (Hutton)

26b. Dorsal spines longest at middle of fin; caudal vertebrae 19.

29a. Membrane from last dorsal fin spine connects at base of first soft dorsal ray; no large black blotch on middle rays of caudal fin.

30a. Dorsal fin rays V,21, occasionally 22; total anal rays 18, occasionally 19; total pectoral rays 16 or 17; scales from lateral line to anus 14–17, and above lateral line 4–6; no black spot on caudal fin base (Japan to China Sea, Comores, east coast of Africa to Durban, Zanzibar).
pulchella (Temminck and Schlegel)

30b. Dorsal fin rays V,22; total anal rays 19, rarely 20; total pectoral rays 14 or 15, rarely 16; scales from lateral line to anus 10–13 and above lateral line 3, rarely 4; black spot at base of upper lobe of caudal fin (Korea, Japan to Formosa, Hong Kong) . . . . . **ommatura** Jordan and Snyder

29b. Membrane of spinous dorsal connects with first soft dorsal ray opposite tip of last dorsal spine; large black blotch on middle rays of caudal fin.

31a. 2 or 3 lengthwise rows of brown spots on cheek; 5–7 dark ocellate spots in a row along ventral side of body (Okinawa; Phillppines; Rennell Islands; Ryukyu Islands; New Caledonia; east coast Africa; Zanzibar; Red Sea).
polyophthalma (Cuvier and Valenciennes)

31b. 4–8 oblique dark lines across cheek; 3–5 dark ocellate spots in a row along ventral side of body (North China and Ryukyu Islands south to Northern Australia, east to Fiji Islands, westward to Red Sea, and south to Durban).
hexophthalma (Cuvier and Valenciennes)

Parapercis simulata, new species

PLATE 1

HOLOTYPE.—USNM 200760, Somali Coast, lat. 11°4′N, long. 51° 15′E, Dec. 17, 1964, IIOE, *Anton Bruun* Cruise 9, Sta. 451, depth 76–80 meters, standard length 150 mm.

PARATYPES.—USNM 200761, same data as holotype, 11 spec., 121–146 mm. USNM 200759, Somali Coast, 11°11′N 51°14′E, Dec. 17, 1964, IIOE, *Anton Bruun* Cruise 9, Sta. 453, depth 47–49 meters, 2 spec., 118 and 126 mm. USNM 250258–F19, Red Sea, Safaga, Egypt, Feb. 9–10, 1964, otter trawl, collector C. J. D. Brown, 1 spec., 143 mm.

DESCRIPTION.—Measurements made on the holotype and 7 paratypes are recorded in table 1. Counts for the holotype and paratypes are recorded in tables 2 to 4.

Teeth present on vomer, absent on palatines; 6 hooked canine teeth (3 on each side) at tip of lower jaw; spinous dorsal fin connected by membrane at base of first soft ray; pectoral rays 9 to 11 (counted from dorsal edge) longest; fourth soft pelvic ray longest; upper caudal fin rays longest and sometimes projecting as a free ray as much as diameter of pupil; scales in a zigzag row around caudal peduncle 24–26.

COLOR IN ALCOHOL.—General background of head and body straw colored, with edges of scales dusky on sides giving a netlike appearance; on lower side dark pigmentation on scale edges intensified to form 5 evenly spaced dusky bars; sometimes there is intensification of pigment on edges of about two vertical scale rows in each area between the 5 larger dusky blotches; belly plain light straw colored;

dusky bar from eye to snout tip; 2 dusky bars from eye across preorbital and maxillary, another dark bar with light center from lower rear of eye downward to corner of mouth, and a dusky pale centered bar across preopercle; all bars separated by light areas; inner rays of pelvic fins blackish; dorsal three-fourths of base of axil of pectoral fin dusky; dark spot near base of middle rays of upper lobe of caudal fin, and sometimes a less intense dark spot in lower lobe in a similar position; caudal fin and posterior soft dorsal rays lightly marked with dusky bars; pectoral and anal fin rays unmarked.

TABLE 1.—*Measurements made on two species of* Parapercis *expressed in thousandths of standard length*

Characters	*P. alboguttata*								*P. simulata*, new species							
	USNM 200693			USNM 200697					Holotype USNM 200760	Paratypes USNM 200761						
Standard length (in mm)	165	136.5	121.5	167	145	119	118.5	117	150	153	153	138	133	130	125	121
Length of head	306	298	317	344	331	322	331	316	287	289	307	290	297	277	297	294
Length of snout	108	98	101	121	114	101	110	94	109	110	108	95	105	100	107	94
Diameter of eye	81	75	82	74	70	79	76	76	69	63	62	77	69	73	73	70
Postorbital length of head	127	131	135	156	161	151	154	149	137	127	130	135	132	123	126	137
Width fleshy interorbital space	42	48	41	69	60	67	49	51	43	56	60	47	43	42	44	41
Snout tip to rear edge maxillary	128	117	123	144	137	124	132	122	120	124	132	111	120	118	116	116
Width of preorbital	50	43	45	63	58	44	53	43	51	50	55	47	50	48	48	41
Least depth of body	63	67	75	62	64	60	63	58	79	75	80	76	79	78	78	75
Greatest depth of body	155	150	165	174	159	162	180	144	177	170	173	174	173	177	174	174
Length fourth dorsal spine		81	77	94	86	91	93	75	87	86	90	85	83	82	90	92
Longest pectoral ray	158	160	173	158	159	166	164	165	157	154	168	167	177	180	160	163
Longest pelvic ray	173	183	189	177	200	181	207	190	191	196	189	203	198	213	200	202
Longest caudal ray	162	161	165	201	204	193	211	172	185	186	202	191	184	206	195	196
Length base of dorsal fin	642	655	626	623	586	621	595	560	646	612	638	674	648	646	684	634
Length base of anal fin	482	458	465	473	469	454	451	418	494	488	483	467	478	485	468	496

Discussion.—This new species was collected at depths between 47 and 80 meters and at an unknown depth in the Red Sea. It is closely related to *P. alboguttata* Günther, type-locality of which is Misoöl Island, about lat. 2°S and long. 130°E, off the western tip of New Guinea. Cantwell (1960, p. 258) reports it from Muscat, Monja Island, China Sea. *Neopercis tesselata* Herre from Manilla Bay, without palatine teeth, was placed in the synonomy of *P. alboguttata* by Cantwell, with which opinion I agree on the basis of a radiograph showing i,17 pectoral rays instead of i,16 as found in *P. simulata*, new species.

Fortunately, the IIOE collected a fine series of specimens of *P. alboguttata* from the Arabian Sea and the Bay of Bengal. A comparison of *P. alboguttata* with *P. simulata* reveals that although the color patterns of the two species are nearly identical, they differ in regard to the following characters: In table 2, it can be observed that *P. alboguttata* almost always has i,17 and i,18 pectoral rays while, in table 3, the gill rakers number 6–9 + 12–15 = 19–23, whereas *P. simulata* has i,16 pectoral and 4 or 5 + 9 or 10 = 13–15 gill rakers respectively. In the genus *Parapercis*, a difference in total number of gill rakers from 13 to 15 compared with 19 to 23 with no overlap in the range is highly significant and indicates in my opinion two distinct species.

An examination of the measurements recorded in table 1 indicates that *P. alboguttata* is a more slender species (least depth of caudal peduncle 58–75, average 64, thousandths; greatest depths 144–180, average 161) than *P. simulata*, (75–80, average 77.5, and 170–177, average 174). In addition, *P. simulata* has a shorter head (277–307, average 292 thousandths of length), smaller eye (62–73, average 69.5), and shorter mouth (snout tip to rear of maxillary 111–132, average 120), whereas in *P. alboguttata* these figures are, respectively, 298–344, average 321; 70–82, average 77; and 117–144, average 128.

In table 5, a comparison of certain body proportions was made and the data in this table shows that the least depth of body into head length is 3.5–4.0 for *P. simulata* and 4.1–5.6 for *P. alboguttata*, and, respectively, for least depth of body into eye, 0.8–1.0 and 1.1–1.3.

Since *P. alboguttata* is known now to range from the China Sea to Muscat in the northern Arabian Sea, it may be thought that *P. simulata* may represent a subspecies of *P. alboguttata*. There was no variability, however, in counts or measurements for *P. alboguttata* that indicated a morphocine or any other data that might be correlated with range.

Other distinct species of fish have identical or nearly identical color patterns: *Paramia quinquelineata* (Cuvier and Valenciennes) and

TABLE 2.—*Frequency distribution of number of soft fin rays recorded for certain closely related species of* Parapercis (x=range of counts from Cantwell, 1964)

Species	Dorsal		Anal				Pectoral				
	21	22	15	16	17	18	1,14	1,15	1,16	1,17	1,18
trispilota	12				12			3	20	1	
bivittata	3	1			3			2	5	1	
schaunislandi											
Hawaii	4				4			7	1		
Seychelles	3				3		2	4			
somaliensis	3				3				6		
alboguttata		20				20			2	69	37
simulata		14				14			25	3	
xanthozona	x				x			x	x		
kamoharai	2		1		1				3	1	

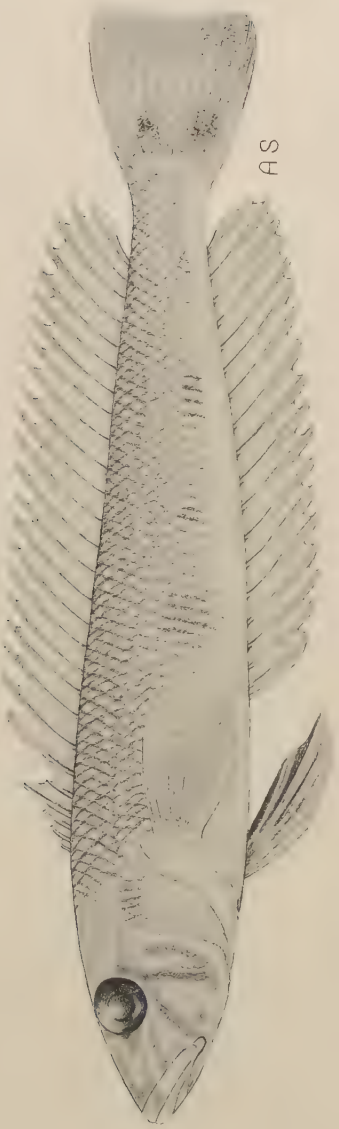
TABLE 3.—*Frequency distribution of number of gill rakers recorded for certain closely related species of* Parapercis (x=range of counts from Cantwell, 1964)

Species	Upper Arch						Lower Arch								Total									
	4	5	6	7	8	9	7	8	9	10	11	12	13	14	15	13	14	15	16	17	18	19	20	21	22	23
trispilota			7						3	4								2	5							
bivittata		2	1						3								2	1							
schaunislandi																										
Hawaii			3	1					3	1								3		1						
Seychelles		2					1	1	1							1	1									
somaliensis		2	1						1	2							1	1	1							
alboguttata			6	10	3	1						4	6	7	3							6	5	4	3	2
simulata	3	10							4	14						1	5	7								
xanthozona			x	x							x	x	x	x						x	x	x	x			
kamoharai			2							1	1								1	1						

TABLE 4.—*Frequency distribution of number of scales recorded for certain closely related species of* Parapercis (x=range of counts from Cantwell, 1964)

Species	Oblique rows																								
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
trispilota						1	2	3	4	2												
bivittata								3	1													
schaunislandi																						
Hawaii									2	1	1											
Seychelles									1	1	1											
somaliensis	1	1			1																	
alboguttata										1	3	4										
simulata								1	3	4	2	1										
xanthozona					x	x	x	x	x	x	x	x	x									
kamoharai																1						1

Species	Above lateral line					Below lateral line to anus					
	4	5	6	7	8	12	13	14	15	16	17
trispilota		12					5	7			
bivittata		4				1		3			
schaunislandi											
Hawaii			4					3	1		
Seychelles		3					1	2			
somaliensis	3					2	1				
alboguttata	7	1					5	3			
simulata	4						7	3			
xanthozona			x	x	x		x	x	x	x	x
kamoharai				2					1	1	



Parapercis simulata, new species: holotype, USNM 200760 (drawn by Ann Schreitz).

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Parapercis somaliensis, new species: holotype, USNM 200751 (drawn by Ann Schreitz).

Parapercis bivittata, new species: holotype, USNM 200752 (drawn by Ann Schreitz).

Parapercis tripilota, new species: holotype, USNM 200721 (drawn by Ann Schreitz).

Cheilodipterops isostigma Schultz; also *Apogon nigrofasciatus* Lachner and *Apogon aroubiensis* Hombron and Jocquinot, among others.

The name "*simulata*" indicates that its color pattern is similar to that of its closest relative, *P. alboguttata*.

Parapercis alboguttata Günther

The following specimens, which were used for a comparison with *P. simulata*, new species, were collected by the International Indian Ocean Expedition during 1963 and 1964: USNM 200684, Nov. 17, 1963, Cruise 4B, Sta. 215A, 21°21′N 68°25′E, depth 123 meters, 1 spec., standard length 116 mm. USNM 200685, Dec. 17, 1964, Cruise 9, Sta. 9–456, off Somali Coast, 11°14′N 51°08′E, 1 spec., 138 mm. USNM 200686, Nov. 18, 1963, Cruise 4B, Sta. 219A, 21°52′N 68°6′E, 115 meters, 3 spec., 103–116 mm. USNM 200687, Nov. 15, 1963, Cruise 4B, Sta. 206A, 20°23′N 70°0′E, depth 71 meters, 6 spec., 103–136 mm. USNM 200688, Mar. 24, 1963, Cruise I, Sta. 22, 10°37′N 97°34′E, depth 96 meters, 1 spec., 125 mm. USNM 200689, Nov. 14, 1963, Cruise 4B, Sta. 202C, 18°27′N 71°13′E, 84 meters, 3 spec., 71–104 mm. USNM 200690, Mar. 30, 1963, Cruise I, Sta. 38, 14°7′N 97°5′E, 11 spec., 77–117 mm. USNM 200691, Mar. 30, 1963, Cruise 1, Sta. 37, 13°28′N 97°19′E, 1 spec., 118 mm. USNM 200692, Mar. 30, 1963, Cruise 1, Sta. 36A, 13°0′N 97°41′E, 3 spec., 110–121 mm. Photo of 121 mm specimen, USNM 200693, Mar. 24, 1963, Cruise 1, Sta.

TABLE 5.—*Comparison of frequency distributions of certain body proportions for* Parapercis simulata *and* P. alboguttata

Species	Least depth of body into head length											Least depth into eye					
	3.5 3.6	3.7 3.8	3.9 4.0	4.1 4.2	4.3 4.4	4.5 4.6	4.7 4.8	4.9 5.0	5.1 5.2	5.3 5.4	5.5 5.6	0.8	0.9	1.0	1.1	1.2	1.3
alboguttata				1		1	1		2	2	1				3	2	3
simulata	2	4	2									2	5	1			

	Greatest depth into length of upper jaw						Diameter of eye into longest pelvic ray										
	.60 .64	.65 .69	.70 .74	.75 .79	.80 .84	.85 .89	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1
alboguttata			1	3	2	2	1		2	2	1		1		1		
simulata	1	5	1	1								1	1	1	3	1	1

	Head into standard length							
	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6
alboguttata	1	2	1	2	2			
simulata					1	5	1	1

Hydro. 21, 9°54′N 97°42′E, 5 spec., 117–163 mm. USNM 200694, Mar. 27, 1963, Cruise 1, Sta. 28A, 11°52′N 92°49′E, 1 spec., 89 mm. USNM 200695, Dec. 3, 1963, Cruise 4B, Sta 269A, 23°43′N 58°23′E, depth 49 meters, 1 spec., 142 mm. USNM 200696, Dec. 3, 1963, Cruise 4B, Sta. 269B, 23°33′N 58°23′E, depth 106 meters, 2 spec., 131 and 184 mm (photographed). USNM 200697, Nov. 14, 1963, Cruise 4B, Sta. 202B, 17°41′N 71°33′E, depth 90 meters, 29 spec., 94–167 mm.

Parapercis somaliensis, new species

PLATE 2

HOLOTYPE.—USNM 200751, off coast of Somali, depth 50–70 meters, Dec. 18, 1964, IIOE, Sta. 468, 11°52′N 51°14′E, standard length 105 mm.

PARATYPES.—USNM 200750, off coast of Somali, depth 67–72 meters, Dec. 18, 1964, IIOE, Sta. 465, 11°37′N 51°27′E, 2 spec., 81 and 120 mm.

DESCRIPTION.—Counts are recorded in tables 2–4 and measurements made on the holotype and paratypes are expressed in thousandths of the standard length in table 6.

Vomer with teeth, none on palatines; 6 canine teeth (3 on each side) near tip of lower jaw; spinous dorsal fin connected by membrane to first soft dorsal ray opposite tip of fifth dorsal spine; ninth branched pectoral ray from dorsal edge longest; upper caudal fin rays elongate, projecting as much as diameter of eye behind rear edge of that fin; scales in a zigzag row around caudal peduncle 24–26.

COLOR IN ALCOHOL.—Body with straw-colored background; dorsal half of body marked with 8 bars, and an additional bar crossing in front of dorsal fin; the checkered nature of these bars ends at a light streak along middle of the side, below which they continue as faintly pigmented bars not reaching base of anal fin; a pair of large brown spots near occiput; preorbital and snout brown, but not continuing on the premaxillary; a wedge-shaped brown bar below eye extending obliquely backward; preopercle light straw colored, except the posterior edge is brown; opercle brownish with about 4 dark brown spots; base of pectoral fin brownish posteriorly and anteriorly; pectoral, pelvic, and anal fins unmarked; dorsal fin rays with brown bases opposite the brown bars on upper sides; caudal fin with several light dusky cross bars.

DISCUSSION.—This new species traces down through Cantwell's (1964, p. 248) key to *P. xanthozona* but differs by having 5 or 6+9 or 10=14–16 gill rakers instead of 6 or 7+11–14=17–20 gill rakers as in *P. xanthozona*. *Parapercis somaliensis* has only 4 scales from lateral line to base of first ray of soft dorsal whereas *P. xanthozona* has 6–8.

Parapercis xanthozona has 6 small brown spots in a row across top of head behind eyes with a pair of small brown spots in front of the row behind interorbital space, whereas *P. somaliensis* has 6 large spots in a row across top of head behind eyes with the 2 spots at middorsal line greatly enlarged and no spots in front of the enlarged ones; the large dark spot just above the opercle in *P. xanthozona* is lacking in *P. somaliensis* or confined to a very intense and small black spot surrounding 2 pores. The series of dark spots on middle rays of caudal fin with a light unpigmented streak separating the spots in *P. xanthozona* are lacking in *P. somaliensis*. *Parapercis somaliensis* has a shorter snout and larger eye than *P. xanthozona* so that the preorbital is contained in the eye of *P. somaliensis* 1.8 to 2.1 instead of 1.1 to 1.4 in *P. xanthozona;* the preorbital into the postorbital is 1.5 to 1.8 instead of 1.9 to 2.2; the snout in head is 3.1 to 3.2 instead of 2.6 to 2.8, respectively.

The name "*somaliensis*" refers to the Republic of Somali off the shores of which this new species was collected.

Parapercis bivittata, new species

PLATE 3

HOLOTYPE.—USNM 200752, Seychelles Islands, south of Round Island, depth 12–15 meters, Feb. 22, 1964, IIOE Sta. F–61, standard length 114 mm.

PARATYPES.—USNM 200754, Seychelles Islands, Amirantes Islands, off north end Eagle Island, depth 6–9 meters, Mar. 4, 1964, IIOE Sta. F–85, 90 mm. USNM 200753, Seychelles Islands, Amirantes Islands, D'Arros Island, off east side, depth 29–34 meters, Mar. 9, 1964, IIOE Sta. F–105, 80.3 mm. USNM 200762, Seychelles Islands, Amirante Islands, near St. Joseph Island, southwest of Ressource Island, off small boat entrance to lagoon, depth 15–27 meters, Mar. 10, 1964, IIOE Sta. F–110, 91 mm.

DESCRIPTION.—Counts are recorded in table 2, and measurements made on the holotype and paratypes are expressed in thousandths of the standard length in table 6.

Vomer with teeth, none on palatines; 6 canine teeth (3 on each side), near tip of lower jaw; spinous dorsal fin connected by membrane to first soft dorsal ray opposite tip of fifth dorsal spine; ninth or tenth branched pectoral ray from dorsal edge longest; upper caudal fin ray elongate and slightly projecting; scales around caudal peduncle in a zigzag row 26.

COLOR IN ALCOHOL.—Body light tan ventrally, light brown dorsally with 3 irregular rows of brown spots on upper sides becoming 2, then 1, on the peduncle; the brown background coloration of the upper side forms 7 light brown bars, separated by light straw coloration,

the bars not extending below the lower row of spots associated with the brown background bars; middle of side with broad light band, speckled with tiny brown spots irregularly spaced and not in a row; lower side of body behind pectoral base with 8 dark bars, the first is composed of 2 or 3 dark spots in a narrow dark streak that meets or almost meets its fellow about midway between anus and pelvic base; the next 7 bars are composed of large dark spots dorsally, thence becoming paler and narrower as they extend ventrally, but not reaching anal fin base; axis of pectoral base with a narrow black bar that extends ventrally and meets its fellow across belly just behind pelvic fin bases; all of the body bars are in line with black spots in the median fins; base of caudal fin with a pair of small dark spots; front of base of pectoral with 2 to 4 small black spots; lower edge of pectoral fin with a small black spot basally; 6 dark spots in a row across top of head behind orbits and a pair of dark spots of same size in front of the row of spots at rear of interorbital space; a few other dark spots in interorbital space; side of head with dark spots and 2 oblique dark bars from below eye extending posteroventrally; caudal fin with tiny dark spots, irregularly scattered; anal fin with 2 rows of dark spots, the basal row composed of larger spots; dorsal

TABLE 6.—*Measurements made on three new species of* Parapercis *expressed in thousandths of standard length*

Characters	*P. bivittata*				*P. somaliensis*			*P. trispilota*			
	Holotype USNM 200752	Paratypes USNM 200754	200753	200762	Holotype USNM 200751	Paratypes USNM 200750		Holotype USNM 200721	Paratypes USNM 200722	200725	200723
Standard length (in mm)	114	90	80.3	91	105	120	81	69	98	74.5	47
Length of head	273	300	299	288	312	308	316	283	281	304	298
Length of snout	97	92	101	92	97	103	91	116	85	99	81
Diameter of eye	61	72	64	66	82	83	94	77	66	74	87
Width fleshy interorbital space	40	42	40	38	51	48	33	35	40	40	32
Snout tip to rear edge of maxillary	111	121	105	115	133	132	123	103	107	113	114
Least depth of body	90	91	87	88	93	93	90	90	92	86	89
Greatest depth of body	171	178	162	185	200	196	210	175	179	174	168
Length of fourth dorsal spine	74	87	87	80	86	87	90	87	80	84	94
Longest pectoral fin ray	174	202	192	179	181	183	185	178	199	201	213
Longest pelvic fin ray	200	228	235	230	210	196	222	234	225	245	277
Longest caudal fin ray	175	211	204	209	257	238	200	184	177	188	213
Length of base of dorsal fin	615	644	632	631	633	621	605	634	651	625	617
Length of base of anal fin	420	444	452	444	449	439	420	435	434	423	448

fin with 3 lengthwise rows of dark spots, the distal row represented by tiny spots as in the anal fin, whereas the two rows, medially and basally, composed of larger dark spots.

Discussion.—This new species traces through Cantwell's key (1964, p. 248) to section 17b and is related to a group of species centering around *P. xanthozona*, *P. kamoharai*, *P. somaliensis*, new species, and *P. trispilota*, new species, described below. *Parapercis kamoharai* has 30–32 scales in a zigzag row around caudal peduncle, 66–72 oblique scale rows, distinct dark cross bars on head, whereas, *P. bivittata* has 26 scales around the caudal peduncle, 58 or 59 oblique scale rows along upper side, and a color pattern completely unlike that of *P. kamoharai*. *Parapercis bivittata* differs from *P. xanthozona* in having only 5 scales above lateral line instead of 6–8; also *P. bivittata* has fewer gill rakers (see table 3) than *P. xanthozona* and a different color pattern.

Parapercis bivittata, new species, differs from *P. trispilota*, new species, chiefly in regard to color pattern, as follows:

Characters	*trispilota*	*bivittata*
number of dark bars across belly between pelvic fin bases and anus	none	2
number of dark spots in the area between depressed pectoral and pelvic fins	3	none
small black specks or spots in light broad band lengthwise along middle of sides	none	numerous
ventral basal edge of pectoral with a black spot	absent	present
axil of pectoral base with a black bar	absent	present
interior side of pectoral base with black spots	none	2–4
number of dark spots on cheek in addition to one below eye	none	4 or 5
dark spots along posterior edge of preopercle	1 or 2	3 or 4
dark spots on branchiostegal memberanes	1 large or 2 small ones	3–5 small ones

The name "*bivittata*" refers to the 2 black streaks across the belly.

***Parapercis trispilota*, new species**

Plate 4

Holotype.—USNM 200721, Seychelles Islands, Curieuse Island, just southeast of point forming south end of Laraie Bay, depth about 9 meters, Feb. 23, 1964, IIOE Sta. F–64, standard length 69 mm.

Paratypes.—USNM 200719, Seychelles Islands, Mahé Island off north tip north of North Island, depth about 27 meters, Feb. 15, 1964, IIOE Sta. F–52, 66 mm. USNM 200722, Seychelles Islands, Mahé, North Islet, west side, depth 8–18 meters, Mar. 16, 1964, IIOE Sta. F–115, 3 specimens, 63–98 mm. USNM 200723, Seychelles Islands, Amirante Islands, D'Arros Island, off east side, depth 24 meters, Mar. 8, 1964, IIOE Sta. F–103, 47 mm. USNM 200724,

Seychelles Islands, Amirantes Islands, D'Arros Island, off east side, depth 29–110 meters, Mar. 9, 1964, IIOE Sta. F-105, 80.3 mm. USNM 200725, Seychelles Islands, Amirantes Islands, near St. Joseph Island, southwest of Ressource Island, depth 27–31 meters, Mar. 7, 1964, IIOE Sta. F–95, 74.5 mm. USNM 200726, Seychelles Islands, near Praslin, south of Round Island, depth 12–15 meters, Feb. 22, 1964, IIOE Sta. F–61, 76.5 mm. USNM 200727, Seychelles Islands, Amirantes Islands, Eagle Islands off north end, depth 6–9 meters, Mar. 4, 1964, IIOE Sta. F–85, 49 mm.

Description.—Counts are recorded in table 2, and measurements made on the holotype and paratypes are expressed in thousandths of the standard length in table 6.

Vomer with teeth, none on palatines; 6 canine teeth (3 on each side) near tip of lower jaw; spinous dorsal fin connected by membrane to first soft dorsal ray nearly opposite tip fifth dorsal spine; ninth branched pectoral ray longest; none of the caudal fin rays elongated and projecting; scales in zigzag row around caudal peduncle 25.

Color in alcohol.—Body light tan, upper sides and back with 9 dusky cross bars, one in front of spiny dorsal, 7 along base of dorsal and one on caudal peduncle; 3 lengthwise rows of small dark spots across dark cross bars becoming 2, then 1, row on caudal peduncle; a broad light band along midside without spots; along middle of lower side 7 or 8 dark spots, each at the dorsal end of a light brown bar that fades ventrally and not reaching anal fin base; pair of small dark spots at base of caudal fin; caudal fin minutely spotted distally; 6 brown spots in a row across head behind eyes with a few dark spots or a pair of dark spots posteriorly in interorbital space. The most characteristic black spots are the 3 in a row beginning between bases of pectoral and pelvic fins and continuing evenly spaced to a vertical line through the middle of a light interspace between the first 2 dark bars at base of dorsal fin; spiny dorsal fin blackish; 2 rows of dark spots lengthwise along anal and 3 in soft dorsal, the distal row in each fin composed of very tiny dark spots.

Discussion.—*Parapercis trispilota* differs from *P. xanthozona*, *P. kamoharai*, and *P. somaliensis* in the same ways that *P. bivittata* differs from them, except in color pattern. *Parapercis trispilota* and *P. bivittata* are distinguished adequately under "Discussion" in *P. bivittata*.

The name "*trispilota*" refers to the 3 dark spots on the area below the depressed pectoral fin.

Additional Species

In addition to the four new species, four other species of *Parapercis* were collected by the three expeditions: *P. hexophthalma* (Cuvier and

Valenciennes), *P. clathrata* Ogilby, *P. cepholopunctata* (Seale), *P. pulchella* (Temminck and Schlegel). In addition, the range for the following three species was extended.

***Parapercis nebulosa* (Quoy and Gaimard)**

The following two collections represent an extension of the range farther into the southern and farther into the northern parts of the Indian Ocean than previously reported: USNM 200718, Dec. 17, 1964, IIOE, Cruise 9, Sta. 462, off Somali Coast, 11°21′N 51°9′E, hand line, 1 spec., 177 mm. USNM 200720, Sept. 25, 1964, IIOE, Cruise 8, Sta. 394B, 29°27′S 31°31′E, shrimp trawl, 1 spec., 195 mm.

***Parapercis schauinslandi* (Steindachner)**

USNM 200763, Mar. 9, 1964, IIOE, Sta. F–105, Seychelles Islands, Amirante Islands, D'Arros Island off east side, depth 27–34 meters, 1 spec., 57 mm. USNM 200764, Mar. 10, 1964, IIOE, Sta. F–110, Seychelles Islands, Amirante Islands, near St. Joseph Island, southwest of Ressource Island, off small boat entrance to lagoon, depth 15–27 meters, 2 spec., 49–65 mm.

The three specimens listed above represent the first known occurrence of this species outside the Hawaiian Islands and the first record for the Seychelles Islands. Usually a reef-inhabiting species found such a great distance apart without occupying the intervening seas is likely to show at least subspecific differences when the populations are compared. In this case, the only possible difference observed was the probability of about one more gill raker on the first arch of the Seychelle specimens. With only three specimens, however, the variability cannot be determined and undoubtedly the range of counts would overlap when more specimens are studied. Tentatively, I refer these Seychelles specimens to *P. schauinslandi*.

***Parapercis polyophthalma* (Cuvier and Valenciennes)**

The following specimens represent the first record of this species from the Seychelles Islands: USNM 200698, Feb. 14, 1964, IIOE, Field No. JR–72, East Aurbariobi-Nossi Be, Madagascar, 13°26′10″S 48°22′54″E, 3 spec., 101–161 mm. USNM 200699, Mar. 10, 1964, IIOE, Sta. F–110, Amirantes Islands, St. Joseph Island, depth 15–27 meters, 4 spec., 113–126 mm. USNM 200700, Mar. 7, 1964, IIOE, Sta. F–95, Amirantes Islands, near St. Joseph Island, depth 25–30 meters 2 spec., 119–133 mm. USNM 200701, Feb. 10, 1964, IIOE, Sta. F–37, Mahé vicinity, Seychelles Islands, depth to 3 meters, 1 spec., 53 mm. USNM 200702, Feb. 4, 1964, IIOE, Sta. F–23, Near Mahé, Seychelles Islands, 1 spec., 59 mm. USNM 200703,

Feb. 2, 1964, IIOE, Sta. F–17, Mahé, Seychelles Islands, depth to 3 meters, 3 spec., 43–71 mm. USNM 200742, Jan. 27, 1964, IIOE, Sta. F–7, Beacon Island, Seychelles Islands, depth 11–15 meters, 1 spec., 30 mm. USNM 200743, Dec. 8, 1964, IIOE, Cruise 9, Sta. HA–19, Indian Ocean, Amirante Islands, St. Joseph Island, Ressource Island, 5°24′50″S 53°19′43″E, 2 spec., 107–112 mm. USNM 200744, Jan. 24, 1964, IIOE, Sta. F–4, Faon Island, Seychelles Islands, depth 13 meters, 1 spec., 61 mm. USNM 200745, Jan. 29, 1964, IIOE, Sta. F–11, Faon Island, Seychelles Islands, depth 11–12 meters, 4 spec., 48–58 mm. USNM 200746, Mar. 6, 1964, IIOE, Sta. F–90, Amirantes Islands, D'Arros Island, depth 6–9 meters, 1 spec., 117 mm. USNM 200747, Jan. 28, 1964, IIOE, Sta. F–10, Faon Island, Seychelles Islands, depth 12–15 meters, 6 spec., 46–119 mm.

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